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[www.wastereuse.eu](http://www.wastereuse.eu)

**Action 5** – Development of alternative agricultural practices.  
Demonstration in greenhouse and field experiments (Spain)

***“Cultivation practices applied during the action. Technical and economical data and qualitative and quantitative comparison between the new and the traditional cultivation practices”***

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## Executive summary

In the framework of the project WASTEREUSE, <http://www.wastereuse.eu/>, Action 5 (*Development of alternative agricultural practices- Demonstration, Spain*) aims to demonstrate the potential agronomic value of different treated and untreated organic wastes, regarding their suitability to promote crop production and quality and the potential effect on soil quality

In the line of this Action, The effect of different fertilization treatments (compost addition, traditional mineral fertilization and combined organic and inorganic fertilization) on the growth of two successive tomato crops and two successive lettuce crops was evaluated in greenhouse. Tomato and lettuce plant were cultivated in soil in appropriate containers, and under hydroponic drip irrigation. For these assays, a loamy soil from southeast Spain and different solid AW characterized in Action 3: a compost from sheep and goat manure (for tomato and lettuce crop), a compost obtained from a mixture of manure+alperujo+olive pruning (tomato crop) and a compost from sewage sludge and sawdust (lettuce crop), were used.

Likewise, the feasibility of using a liquid organic waste (pig slurry liquid fraction) in irrigation for lettuce and tomato plant cultivation under greenhouse conditions was also evaluated in two successive tomato crops and two successive lettuce crops. The effect of this practice on plant yield and soil characteristics is discussed in this report.

All greenhouse experiments have been carried out in in the CEBAS-CSIC experimental farm "Tres caminos" sited in the area "La Matanza", in Santomera, SE Spain (see situation map in the Annex).

The feasibility of the application of two treated organic wastes (composts) as organic fertilizers in two grain crops (wheat and barley) in open field conditions has been also demonstrated. To this, the effect of different fertilization treatments (organic, mineral and their combination) on the growth of soft wheat and barley has been evaluated in two successive crop periods in the experimental farm "Las Tiasas" sited in Barrax (Albacete), Castilla-La Mancha Region, Spain (see situation map in the Annex). Two organic wastes selected from those characterized in Action 3 were tested: compost from sheep and goat manure and compost from sewage sludge.

Parameters such as moisture, pH, EC, total C and N, organic C, total and available elements (P, K, Fe, Mn, Mg, B, S, Ca and Na) and heavy metals, anions and water holding capacity were determined in the soils before and after each crop. Soil and leaves samples were collected after harvesting the different crops for nutrients (macro and micro-nutrients) and heavy metal content analysis. Parameters such as soil microbial respiration, microbial biomass C and dehydrogenase and some hydrolase activities, indicators of soil microbial population size and activity were also determined.

In tomato crop, tomato fruits were collected for two months as they reached suitable maturity level. Each fruit was weighted and its equatorial and longitudinal diameter (mm) was measured, in order to calculate the shape index  $IF = \text{equatorial diameter} / \text{longitudinal diameter}$ , as well as firmness. In the juice obtained from representative fruits of each treatment the following parameters were determined at two different harvesting times: juice percentage, pH, EC, total soluble solids (TSS) expressed as °Brix (Atago N1 refractometer), titratable acidity (TA), TSS/TA ratio and dry matter.

In cereal crops, macro and micro-nutrient and heavy metal content were determined in wheat and barley grain as well as harvest index and parameters indicator of grain quality.

In the present deliverable, data from all these cultivation practices (10 crops in total) are presented and discussed; technical and economic data and qualitative and quantitative comparison between the new and the traditional cultivation practices are also provided.